SECTION 03 36 01
CONCRETE POLISHING NO DYE

*************************************************************************************************************
THIS SPECIFICATION IS PROVIDED BY PROSOCO, INC. AS A SERVICE AND IS INTENDED TO BE USED AS A PROJECT SPECIFIC SPECIFICATION SECTIONS. ONLY LISTED APPLICATORS MAY APPLY THE CONSOLIDECK® HIGH PERFORMANCE CONCRETE FLOOR SYSTEM. CONTACT PROSOCO, INC CUSTOMER CARE at 800-255-4255 FOR A LISTED APPLICATOR.
*************************************************************************************************************

PART 1 GENERAL

1. 01 SUMMARY

A. Section Includes
   1. Liquid hardeners to protect horizontal concrete surfaces.

B. Related Sections
   1. Section 01 74 00 – Cleaning and Waste Management
   2. Section 03 31 00 – Structural Concrete
   3. Section 03 33 00 – Architectural Concrete
   4. Section 03 39 00 – Concrete Curing
   5. Section 07 90 00 – Joint Protection
      a. Grinding & Polishing of Concrete
      b. Application of the Consolideck® High Performance Concrete Floor System, including liquid concentrate hardener and densifier.
      c. Consolideck® Owner’s Manual
      d. Consolideck® Test Results

C. Related Work:
   1. Section 03 30 0 – Cast-In-Place Concrete

1.02 REFERENCES


C. ASTM-D-3363-05 Standard Test Method for Film Hardness by Pencil Test.


E. Rilem Test Method Test No. II.4 Measurement of Water Absorption Under Low Pressure.
F. ASTM-C-779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces

G. ASTM-G-23-81, Ultraviolet Light & Water Spray

H. ASTM-C-805, Impact Strength

I. American Concrete Institute ACI 302.1-89, Guide for Concrete Floor and Slab Construction

J. Other Test
   1. Reflectivity

K. Product must meet SCS Indoor Air Quality Gold Certification level tested by SCS.

L. Product must be a registered product with NSF approval. www.nsfwhitebook.org

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Submittal Procedures

B. Product Data: Submit manufacturer’s product data sheets on all products to be used for the work. Submit description for protection of surrounding areas, surface preparation, application, and final cleaning.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer’s full range of available colors.

D. Verification Samples: For each finish product specified, two samples, minimum size 2 inches (51 mm) square, representing actual product, color, and finish.

E. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.

F. Manufacturer’s acknowledgement of applicator qualifications

G. VOC Certification: Submit certification that products furnished comply with regulations controlling use of volatile organic compounds (VOC).

H. Comply with pertinent provisions of Section 01 60 00 – Product Requirements.
   1. Provide submittal information within 35 calendar days after the contractor has received the owner’s notice to proceed.

I. Product data: High tolerance hardened concrete floor finish shall comply with the following performance requirements.
   1. Performance Characteristics:
      a. ANSI B101.1 Walkway Standard for Hard Surfaces. Finished concrete must meet or exceed the new high traction standard for wet hard surfaces of 0.60, as measured by the BOT-3000, using a neolite foot sensor. Measurement must be done in four directions in each zone tested and an average COF value must be referenced. The generally accepted COF value of 0.80 for ramps as referenced by the ADA Act.
b. Degree of Reflectiveness as per horizontal test area tested in accordance with ASTM-E-430.
c. Degree of Hardness as per horizontal test area tested in accordance with ASTM-D-3363-05.
d. Measure of Water Absorption as per horizontal test area tested in accordance with Rilem Test Method Test No. II.4

J. Submittals
1. Submit Consolideck® High Performance Concrete Floor System specifications and test data.
2. Submit special concrete finishes describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this section.
3. Submit special concrete finishes manufacturer's recommended installation procedures, which when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
4. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
5. Submit special concrete finishes manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.
6. Follow all special concrete finishes published manufacturer's installation instructions.

K. Test Reports
1. Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.

L. Samples
1. Each floor has its own unique appearance when completed. Manufacturer's lab samples are supplied only to show a smooth surface indicative of the gloss, not the mix color or aggregate size, color or amount of aggregate exposed. The final appearance of a finished floor cannot be guaranteed to match a sample due to the natural variations in concrete.

M. Product Variations: Consolideck® LS®
1. The variegated colors and appearance are unique to each concrete surface and depend on the chemical composition, mix design, porosity, age, texture and color of the concrete substrate. Mottling and wide variations in color and intensity may occur. If contaminants remain on the surface, the penetration of the Consolideck® LS® may be blocked. Concrete from different loads or pours, and in patched areas, may appear significantly different from adjacent areas, when treated with Consolideck® LS®.
2. No private label products will be accepted.

N. Fly Ash
1. No more than 20 percent of the weight of the Portland Cement should be substituted with fly ash. If fly ash is to be substituted, Class C is preferred.
1.04 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Use only a Factory Trained Consolideck® installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
   2. The special concrete finish manufacturer, PROSOCO, Inc., shall approve the applicator. No other applicators are allowed. PROSOCO, Inc. will provide a job specific letter per job.
   3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section. Applicator must have availability of proper equipment to perform work within scope of this project on a timely basis. Applicator should have successfully performed a minimum of 5 projects of at least 5,000 square feet each.

B. Manufacturer's Certification
   1. Provide letter of completion from PROSOCO, Inc. stating that installer is listed applicator of special concrete finishes, and has completed the Consolideck® Factory Training Program.

C. Protection
   1. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
      a. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
      b. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
      c. No pipe cutting machine will be used on the inside floor slab.
      d. Steel will not be placed on interior slab to avoid rust staining.
      e. All equipment must be equipped with non-marking tires.
      f. Do not drag or drop equipment or material across the slab which will scratch or chip it.

D. Pre-Construction Meeting: Convene a pre-construction meeting before the start of work on new concrete slabs, patching of existing concrete slabs and start of application of concrete finish system. Require attendance of parties directly affecting work of this Section, including the Contractor, Architect, concrete installer, finish applicator, and manufacturer’s representative. Review environmental regulations, test area procedures, protection of surrounding areas, surface preparation, application, field quality control, final cleaning, and coordination with other work. Review the following:
   1. Physical requirements of completed concrete slab and slab finish.
   2. Locations and time of test areas.
   3. Protection of surfaces not scheduled for finish application.
   5. Application.
   6. Repair.
   7. Quality control.
   8. Cleaning.
   9. Protection of finish system.
   10. Coordination with other work.
1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original containers, with seals unbroken, bearing manufacturer labels indicating brand name and directions for storage.

B. Dispense special concrete finish material from factory sealed containers.

C. Store containers upright in a cool, dry, well-ventilated place, out of the sun with temperature between 40 and 100 degrees F (4 and 38 degrees C).

D. Protect from freezing.

E. Store away from all other chemicals and potential sources of contamination.

F. Keep lights, fire, sparks and heat away from containers.

G. Do not drop containers or slide across sharp objects.

H. Do not stack pallets more than three high.

I. Keep containers tightly closed when not in use.

J. Store and handle materials in accordance with manufacturer’s written instructions.

1.06 PROJECT CONDITIONS

A. Environmental limitations:
   1. Comply with manufacturer’s written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
      a. Concrete must have a minimum Floor Flatness rating of 35.
      b. Concrete must have a minimum Floor Levelness rating of 20.
      c. Concrete must be cured a minimum of 28 days or as directed by the manufacturer before application of Consolideck® LS® can begin.
      d. Early application of Consolideck® LS® prior to 28 days is acceptable. Please check with PROSOCO, Inc. for acceptable practices.
      e. Application of Consolideck® LS® shall take place prior to installation of equipment, thus providing a complete, uninhibited concrete slab for application.

B. Close areas to traffic during floor application and after application for time period recommended in writing by manufacturer.

C. The completed slab will be covered to prevent damage by the other trades during floor completion.

D. Temperature Limitations:
   1. Do not apply when surface and air temperature are below 40 degrees F (4 degrees C) or above 95 degrees F (35 degrees C) unless otherwise indicated by manufacturer’s written instructions.
2. Do not apply when surface and air temperatures are not expected to remain above 40 degrees F (4 degrees C) for a minimum of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.

E. Do not apply under windy conditions such that the concrete surface treatment may be blown to surfaces not intended.

F. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.

G. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.

H. Temporary Lighting: Minimum 200 W light source, placed 8 feet (2.5 meters) above horizontal concrete surface for each 425 square feet (40 square meters) of concrete being finished.

I. Temporary Heat: Ambient temperature of 50 degrees F (10 degrees C) minimum.

J. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer’s instructions.

PART 2 PRODUCTS

2.01 MATERIALS AND MANUFACTURERS

A. Hardening/Sealing Agent

1. Acceptable product: Consolideck® LS® Lithium Silicate
      www.consolideck.com
   b. Substitutions: Not Permitted. No Private Label
   c. Description: Premium hardener and sealer for concrete surfaces. A penetrating lithium-silicate treatment reacting with the calcium hydroxide from concrete hydration to produce insoluble calcium silicate hydrate (C-S-H).
   d. Properties:
      1) Form: clear, water-like liquid
      2) Specific Gravity: 1.10
      3) pH: 11.0
      4) Weight/Gallon: 9.2 lbs.
      5) Active Content: 14.5 percent
      6) Total Solids: 14.5 percent
      7) Freeze Point: 32 degrees F (0 degrees C)
      8) Shelf Life: 2 years in tightly sealed, unopened container.
      9) VOC Content: 0 g/L; California CHPS: Tested and conforms to Section 01 35 00 (Special Environmental Requirements) LEED® for Schools; Tested and qualifies for EQ Credit 4: Low Emitting Materials (Option 2)
B. Protective Treatments

1. Acceptable product: Consolideck® LSGuard®
   b. Substitutions: Not Permitted. No Private Label
   c. Description: LSGuard® is a high-gloss penetrating premium sealer containing lithium silicate hardener for horizontal concrete surfaces, including cement terrazzo. Treated surfaces resist damage from water, chemical attack and abrasion.
   d. Properties:
      1) Form: milky white liquid
      2) Specific Gravity: 1.11
      3) pH: 11.0
      4) Weight/Gallon: 9.2 pounds
      5) Active Content: 22 percent
      6) Total Solids: 22 percent
      7) Freeze Point: 32 degrees F (0 degrees C)
      8) Shelf Life: 1 year in tightly sealed, unopened container
      9) VOC Content: less than 100 g/L; California CHPS: Tested and conforms to Section 01 35 00 (Special Environmental Requirements) LEED® for Schools; Tested and qualifies for EQ Credit 4: Low Emitting Materials (Option 2)

2. Acceptable product: Consolideck® PolishGuard
   b. Substitutions: Not Permitted. No Private Label
   c. Description: PolishGuard is a durable, chemical resistant, high gloss protective coating that dramatically increases the stain resistance of interior floors. This chemical-resistant, non-yellowing formulation enhances the appearance of standard gray, integrally colored, dyed, stained or color-hardened concrete floors.
   d. Properties:
      1) Form: milky white liquid
      2) Specific Gravity: 1.01
      3) pH: 8.4
      4) Weight/Gallon: 8.50 pounds
      5) Active Content: 15 percent
      6) Total Solids: 15 percent
      7) Flash Point: greater than 200 degrees F (greater than 93 degrees C) ASTM-D-3278
      8) Freeze Point: 32 degrees F (0 degrees C)
      9) Shelf Life: 1 year in tightly sealed, unopened container
     10) VOC Content: 100 g/L maximum; California CHPS: Tested and conforms to Section 01 35 00 (Special Environmental Requirements) LEED® for Schools; Tested and qualifies for EQ Credit 4: Low Emitting Materials (Option 2)
3. Acceptable product: Consolideck® SLX100® Water & Oil Repellent
   b. Substitutions: Not Permitted. No Private Label
   c. Description: SLX100® Water & Oil Repellent combines water and oil repellency on most substrates to prevent staining by waterborne and oily substances. This modified “neat” silane system offers invisible protection and low volatility.
   d. Properties:
      1) Form: clear liquid, slight solvent odor
      2) Specific Gravity: 0.913
      3) Weight/Gallon: 7.60 lbs.
      4) Active Content: 93 percent
      5) Total Solids: 58 percent
      6) Flash Point: 80 degrees F (27 degrees C) ASTM D 3278
      7) Shelf Life: 1 year in unopened, factory sealed container
      8) VOC Content: 400 g/L maximum. Not available in all air quality management jurisdictions, except in regulation-exempt small container size

4. Acceptable Product: Consolideck® SLX100® Water & Oil Repellent Less Than 350
   b. Substitutions: Not Permitted. No Private Label
   c. Description: SLX100® Water & Oil Repellent Less Than 350 combines effective water and oil repellency on densified concrete with VOC levels low enough to be used in every US State, including most of California. This modified “neat” silane system offers invisible protection and low volatility, and prevents staining by waterborne and oily substances.
   d. Properties:
      1) Form: clear liquid slight solvent odor
      2) Specific Gravity: 0.909
      3) Weight/Gallon: 7.56 pounds
      4) Active Content: 93 percent
      5) Total Solids: 62 percent ASTM D 5095
      6) Flash Point: 107 degrees F (42 degrees C) ASTM-D-3278
      7) Shelf Life: 1 year in tightly-sealed, unopened container
      8) VOC Content: 350 g/L maximum. Not available in all air quality management jurisdictions, except in regulation-exempt small container size

C. Maintenance Cleaning Products
1. Consolideck® LSKlean Super Concentrate
   b. Substitutions: Not Permitted. No Private Label
   c. Description: A concentrated maintenance cleaner for concrete floors. The lithium-silicate component helps maintain concrete hardness by curing any “soft” calcium hydroxide left over from the original hardening-densifying treatment.
   d. Properties:
      1) Form: clear blue liquid, fresh clean odor
2) Specific Gravity: 1.014
3) pH: 11.0
4) Weight/Gallon: 8.45 pounds
5) Flash Point: greater than 200 degrees F (greater than 93 degrees C) ASTM-D-3278
6) Freeze Point: 30 degrees F (-1 degrees C)
7) Shelf Life: 2 years in tightly sealed, unopened container
8) VOC Content: less than 1 percent

D. Factory Trained Applicator:
   1. Only approved Factory Trained applicators allowed.
   2. For an approved applicator contact: PROSOCO, Inc. Customer Care Department, 3741 Greenway Circle, Lawrence, KS 66046, 800-255-4255, 785-865-4200, Fax 800-877-2770, www.consolideck.com

2.02 RELATED MATERIALS
A. Water
   1. Potable

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine substrate with installer present for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that base slab meets finish and surface profile requirements in Division 3 Section “Cast-In-Place Concrete” and Project Conditions above.

C. Prior to application, verify that floor surfaces are free of construction latents.

D. Obtain and follow manufacturer’s instructions for examination and testing of substrates.

E. Verify by examination that masonry and concrete surfaces are acceptable to receive the specified products. Notify the Architect if surfaces are not acceptable to receive the specified products.

F. Preparation
   1. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration or performance of specified product from surfaces. Use appropriate concrete cleaners approved by the concrete surface treatment manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of product.
   2. Repair, patch and fill cracks, voids, defects and damaged areas in surface as approved by the Architect. Allow repair materials to cure completely before application of product.
   3. Variations in substrate texture and color will affect final appearance and should be corrected prior to application of sealer/hardener system and the polishing steps.
   4. Protect surrounding areas prior to application. If product is accidentally misapplied to adjacent surfaces, flush with water immediately before material dries.
5. Avoid contact in areas not to be treated. Avoid contact with metal, glass and painted surfaces.
6. Seal open joints in accordance with Section 07 90 00 – Joint Protection.
7. Apply specified sealants and caulking and allow complete curing before application of Liquid Hardener.

G. Application – Liquid Hardener
1. Apply products to substrates in accordance with manufacturer’s instructions, and application procedures. Confirm instructions on current Product Data Sheet that can be found on manufacturer’s website, www.consolideck.com
2. Apply to clean, dry, and properly prepared surfaces approved by the Architect.
3. Clean surface with an auto-scrubber using recommended Consolideck® LSKlean Super Concentrate to remove all surface dust and debris before grinding or polishing.
4. Remove and dispose of all waste from the process of grinding, polishing (dry or wet) and cleaning in accordance with all environmental regulations.
5. Surface must be ground to open pores with minimizing aggregate exposure. Starting point for grinding is to be determined on test panel. Recommendation is to start with high grind, 200 grit and work down to level that opens surface, removes surface defects such as trowel marks, etc. while providing a uniform surface. Initial grind should be done in two perpendicular crossing passes at the same grind level. Applicator reserves the right based on the slab conditions to alter any and all grinding procedures.
6. Surface is to be cleaned between each grind level using an auto-scrubber with Consolideck® LSKlean Super Concentrate to remove debris from the process. This is to be done regardless of whether wet or dry grinding.
7. After initial grind, move up in grind levels in two perpendicular crossing passes without skipping level until one level below finish level.
8. At one level below final finish level, apply liquid hardener at a coverage rate established on the Test Panel, estimated coverage to be 800 to 1,000 square feet per gallon. Actual coverage rate is to be determined by slab surface. Apply by High Volume Low Pressure spray. Best practices use of a 0.5 gpm nozzle is highly recommended.
9. Do not dilute or alter product. Apply as packaged.
10. Do not apply to painted surfaces.
11. Allow applied material to remain on the surface for approximately 10 to 15 minutes for reaction. If material puddles on surface, move applied material around with a micro fiber pad to achieve uniform coverage. Do not apply additional material.
12. Allow applied material on surface to dry, approximately 30 to 60 minutes before polishing next level. If white residue appears on surface after drying, material will be removed in final polishing level.
13. Polish at final level in two perpendicular crossing passes.
14. Treated horizontal concrete surface shall meet criteria performance test established in 1.06 C. of this specification.

3.02 EQUIPMENT

A. Generally the grinding machines must be adequate for the size of the job.
1. Initial grinding should be done with a machine with planetary/counter rotating concrete grinding heads to give the best preliminary scratch pattern needed for a good finished sheen.
2. Areas over 6,000 square feet are considered large projects and machines with a 32 inch grinding area are recommended. Smaller projects recommend a heavy 21 inch or comparable planetary/counter rotating machine.

3.03 Scope of Work
A. The following Consolideck® High Performance Floor/High Performance Decorative Floor process must be used. Floors should be started using a 50 or 100 grit resin pad depending on the condition of the slab. A concrete grinding machine with planetary heads/counter rotating must be used. Factory Trained Applicator reserves the right to change grit starting level and all other aspects that will contribute to the specified gloss in the specifications. The remaining process follows:

1. New Construction: Always refer to specifications when performing individual work.
   a. This process will require the use of 50/80 grit metal/resin or combination diamonds. Best Practice: Perform each pass perpendicular to the other pass north/south then east/west; multiple passes may be needed.
   b. Clean floor with Consolideck® LSKlean Super Concentrate.
   c. Perform water test to determine if the substrate receives water.
   d. Grind the floor with 120 grit diamonds; refer to Best Practices.
   e. Clean Floor with Consolideck® LSKlean Super Concentrate.
   f. Polish floor with 220 grit diamonds; refer to Best Practices.
   g. Clean floor with Consolideck® LSKlean Super Concentrate.
   h. Polish floor with 400 grit diamonds; refer to Best Practices.
   i. Clean floor with Consolideck® LSKlean Super Concentrate.
   j. High speed burnish floor with Consolideck® HEAT Pad.
   k. Application of Consolideck® LS® at 800 to 1,000 square feet per gallon; refer to manufacturer’s data sheet.

OPTIONS:
   l. Application of either Consolideck® LSGuard® or Consolideck® PolishGuard to occur at this stage in lieu of additional polishing steps. Please refer to application instructions on manufacturer’s product data sheet or call Customer Care at 800-255-4255 or visit www.consolideck.com
   m. Application of Consolideck® SLX100® or SLX100® Less Than 350 to occur at this stage in lieu of additional polishing steps. DO NOT BURNISH SLX100® or SLX100® Less Than 350. Please refer to application instructions on manufacturer’s product data sheet or call Customer Care at 800-255-4255 or visit www.consolideck.com
   n. Polish floor with 800 grit diamonds; refer to Best Practices.
   o. Clean floor with Consolideck® LSKlean Super Concentrate.
   p. Polish with 1500 grit diamonds; refer to Best Practices.
   q. Final clean of entire floor with Consolideck® LSKlean Super Concentrate.
   r. Application of either Consolideck® LSGuard® or Consolideck® PolishGuard achieving an average gloss reading of 45 using a Horbra Gloss Meter.
   s. Application of Consolideck® SLX100® or SLX100® Less Than 350 to occur at this stage in lieu of additional polishing steps. DO NOT BURNISH SLX100® or SLX100® Less Than 350. Please refer to application instructions on manufacturer’s product data sheet or call Customer Care at 800-255-4255 or visit www.consolideck.com
   t. Burnish floor with approximately 3600 rpm (engine speed) machine equipped with Consolideck® HEAT pad or diamond pad to achieve a heat reading on the floor of 91 degrees F (33 degrees C) or higher.
END OF SPECIFICATION